

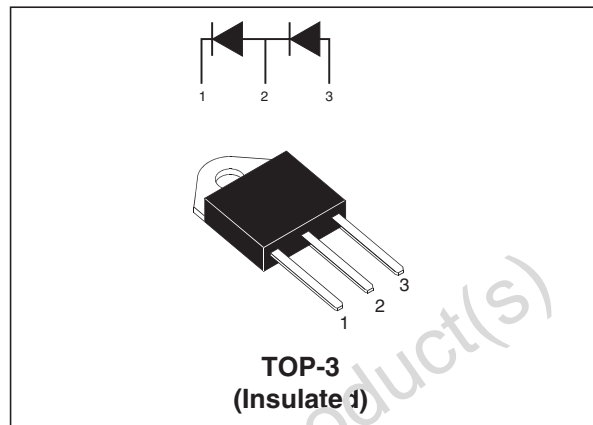
## Tandem 600V HYPERFAST RECTIFIER

### MAJOR PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	30 A
$V_{RRM}$	600 V (in series)
$T_j$ (max)	150 °C
$V_F$ (max)	2.6 V
$I_{RM}$ (typ.)	6.7 A

### FEATURES AND BENEFITS

- ESPECIALLY SUITED AS BOOST DIODE IN CONTINUOUS MODE POWER FACTOR CORRECTORS AND HARD SWITCHING CONDITIONS
- DESIGNED FOR HIGH  $di_F/dt$  OPERATION. HYPERFAST RECOVERY CURRENT TO COMPETE WITH SiC DEVICES. ALLOWS DOWNSIZING OF MOSFET AND HEATSINKS
- INTERNAL CERAMIC INSULATED DEVICES WITH EQUAL THERMAL CONDITIONS FOR BOTH 300V DIODES
- INSULATION (2500V<sub>RMS</sub>) ALLOWS PLACEMENT ON SAME HEATSINK AS MOSFET FLEXIBLE HEATSINKING ON COMMON OR SEPARATE HEATSINK.
- MATCHED DIODES FOR TYPICAL PFC APPLICATION WITHOUT NEED FOR VOLTAGE BALANCE NETWORK
- Package Capacitance: C=16pF



### DESCRIPTION

The TURBOSWITCH "H" is an ultra high performance diode composed of two 300V dice in series. TURBOSWITCH "H" family drastically cuts losses in the associated MOSFET when run at high  $di_F/dt$ .

### ABSOLUTE RATINGS (limiting values, for both diodes)

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	32	A
$I_{FSM}$	Surge non repetitive forward current	tp = 10 ms sinusoidal 180	A
$T_{stg}$	Storage temperature range	-65 +150	°C
$T_j$	Maximum operating junction temperature	+ 150	°C

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**THERMAL AND POWER DATA**

Symbol	Parameter	Test conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Total	1.3	°C/W
P	Conduction power dissipation for both diodes	$I_{F(AV)} = 30\text{ A}$ $\delta = 0.5$ $T_c = 20^\circ\text{C}$	100	W

**STATIC ELECTRICAL CHARACTERISTICS** (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25^\circ\text{C}$		40	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		60	
$V_F^{**}$	Forward voltage drop	$I_F = 30\text{ A}$	$T_j = 25^\circ\text{C}$		3.6	V
			$T_j = 125^\circ\text{C}$		2.1	

Pulse test : \*  $t_p = 100\text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation :

$$P = 1.8 \times I_{F(AV)} + 0.026 I_{F(RMS)}^2$$

**DYNAMIC CHARACTERISTICS** (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $T_j = 25^\circ\text{C}$		25		ns
		$I_F = 1\text{ A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$			45	
$I_{RM}$	Reverse recovery current	$V_R = 400\text{ V}$ $I_F = 30\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$		6.7	8.5	A
S	Reverse recovery softness factor			0.3		-

**TURN-ON SWITCHING CHARACTERISTICS** (for both diodes)

Symbol	Parameter	Tests Conditions	Min.	Typ.	Max.	Unit
$t_{fr}$	Forward recovery time	$I_F = 30\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_F\text{ max}$			400	ns
$V_{FP}$	Transient peak forward recovery voltage	$I_F = 30\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			6	V

Fig. 1: Conduction losses versus average current.

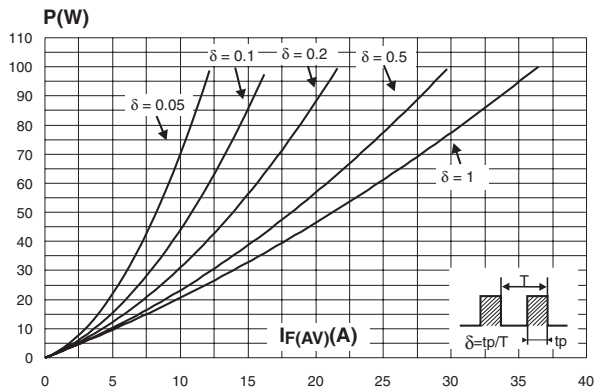


Fig. 2: Forward voltage drop versus forward current.

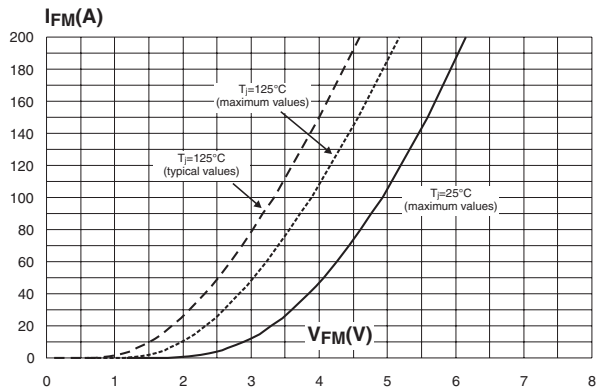


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

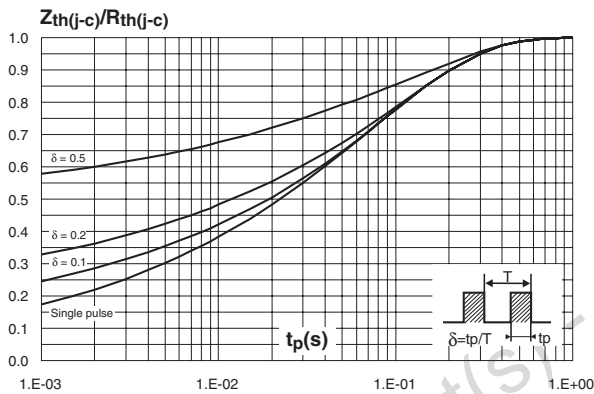


Fig. 4: Peak reverse recovery current versus dIF/dt (90% confidence).

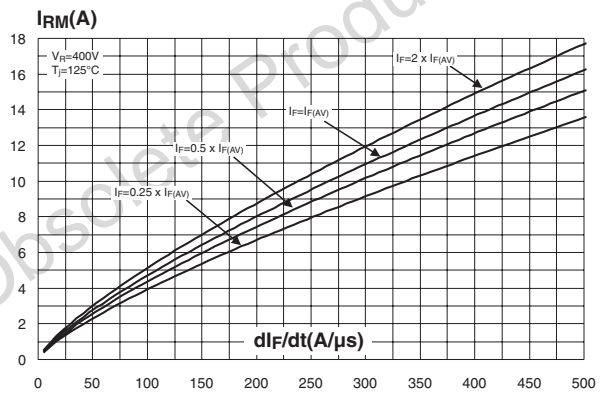


Fig. 5: Reverse recovery time versus dIF/dt (90% confidence).

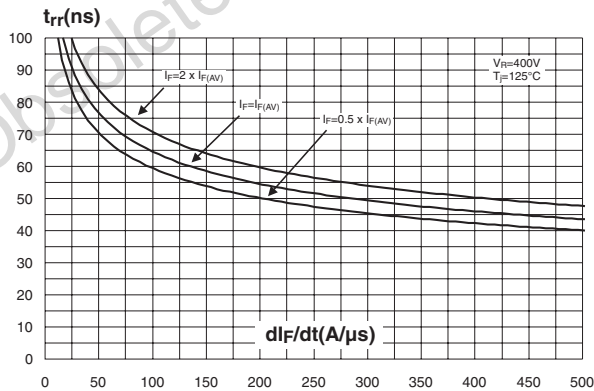
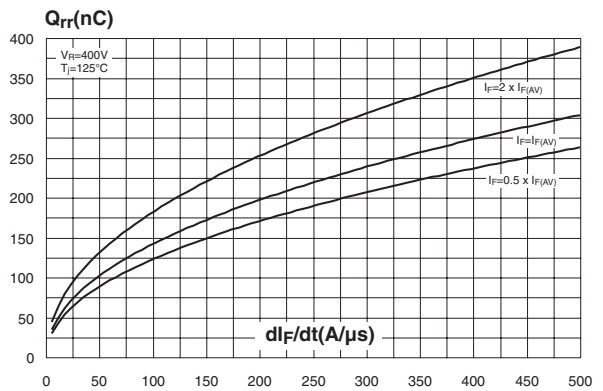
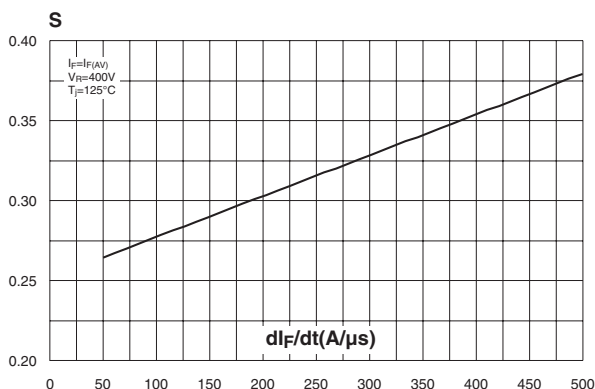


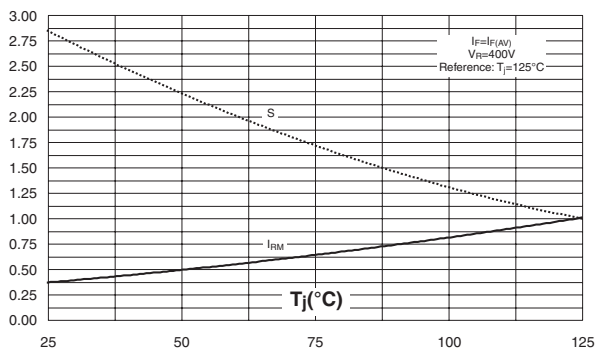
Fig. 6: Reverse recovery charges versus dIF/dt (90% confidence).



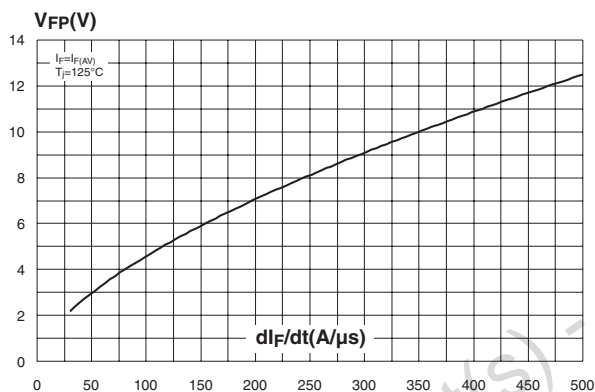
**Fig. 7:** Reverse recovery softness factor versus  $di_F/dt$  (typical values).



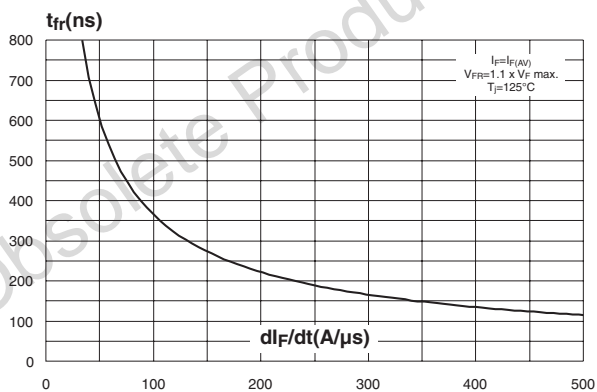
**Fig. 8:** Relative variation of dynamic parameters versus junction temperature (reference:  $T_J = 125^\circ C$ ).



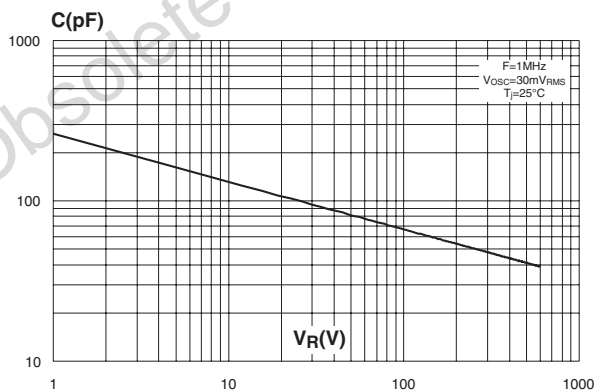
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).

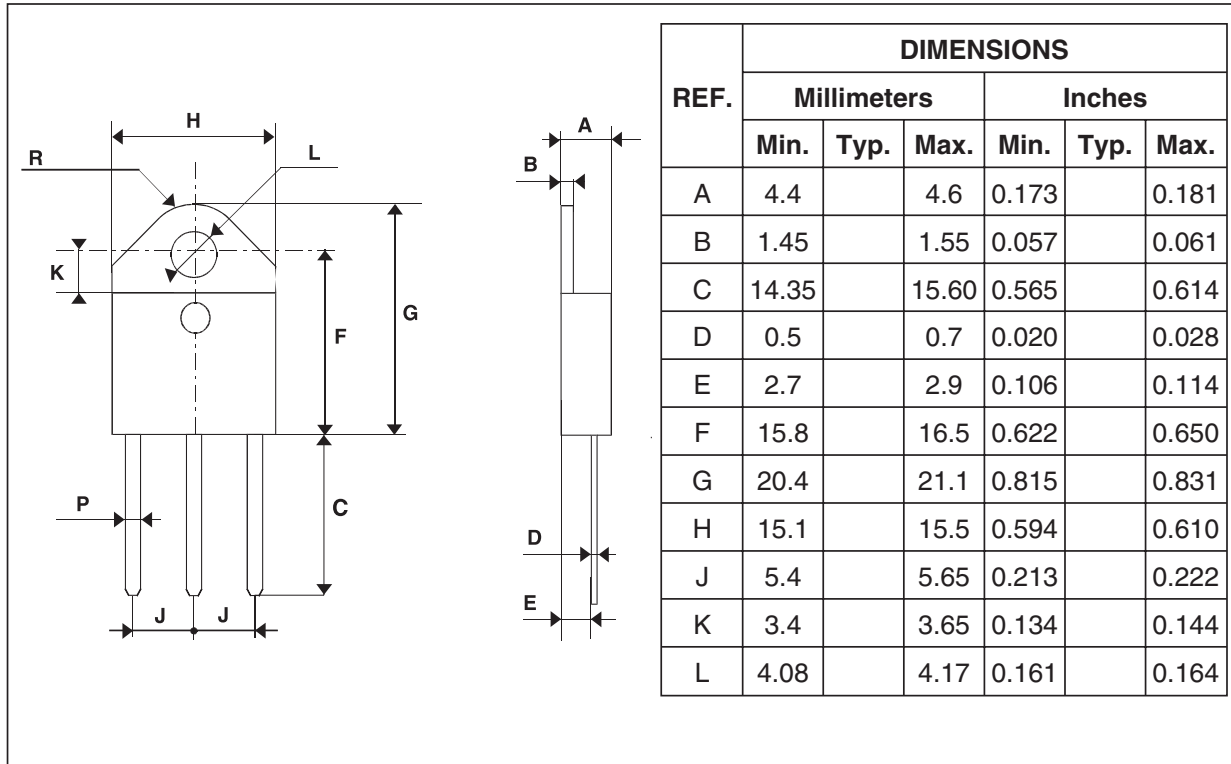


**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



**PACKAGE MECHANICAL DATA**  
 TOP-3 Insulated


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH3006TPI	STTH3006TPI	TOP-3 Ins.	4.5 g.	30	Tube

- Cooling method: C
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1 N.m.
- Epoxy meets UL94,V0

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